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**(51) INTL. CL. H04M-001/57**

**(19) (CA) APPLICATION FOR CANADIAN PATENT (12)**

**(54) Programmable, Caller Identification Telephone Alerting  
device**

**(72) Reidpath, Vernon - Canada ;**

**(71) Same as inventor**

**(57) 6 Claims**

**Notice: This application is as filed and may therefore contain an  
incomplete specification.**

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ABSTRACT

A telephone answering device provides an audible signal that corresponds to the category of incoming calls, in accordance with a programmed allocation of 05 caller identification numbers effected by the person acting as a recipient of calls.

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Title: PROGRAMMABLE CALLER IDENTIFICATION  
TELEPHONE ALERTING DEVICE

Field of the Invention

The present invention is directed to subscriber  
05 telephone apparatus in general, and in particular to  
apparatus for selectively alerting the subscriber to  
incoming calls. More particularly, it is directed to a  
method and apparatus for enabling a subscriber to  
program the apparatus and classify incoming calls into  
10 classes and generate different alerting signals  
depending on, and indicative of, the class to which an  
incoming call has been assigned. In the preferred  
embodiment, the typical telephone system calling number  
identification signal is used for this purpose.

15 Prior Art of the Invention

The closest prior art to the invention that is  
known is United States Patent Number 4,791,664 granted  
December 13, 1988 to Lutz et al. This reference  
discloses a system for selectively receiving incoming  
20 telephone calls at a phoneset and includes an automatic  
answering device which answers all incoming calls by

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placing a simulated phone load across the phone lines.

The answering device also enables a dual tone

multifrequency (DTMF) receiver to receive tone

frequencies input by a caller. The DTMF receiver

05 decodes the tone pulses provided by the caller into

binary coded decimal values which are stored in

successive storage registers. A comparator compares the

values stored in the registers with a respective code

for "authorized" calls input by the subscriber and

10 outputs a signal when the code dialed in by the caller

matches the code previously input by the subscriber.

The signal activates an electronic ringer circuit which

serves to alert the subscriber in the normal manner to

the presence of an authorized call. An off-hook

15 detector detects the pick-up of a phoneset by the

subscriber and acts to disable the electronic ringer

circuit. Upon the placing of the phoneset back into its

cradle, the off-hook detector activates an automatic

reset circuit which resets the automatic answering

20 device as well as the code storage registers.

Thus, in the Lutz et al patent, a caller must

enter a code prearranged with the recipient of the call

in order for his call to penetrate this call-filtering

system. There is no provision for a subscriber to

25 preprogram his/her station apparatus to operate without

the cooperation of the calling party. Moreover, in Lutz et al, a calling party is either "authorized", when the subscriber is alerted, or the caller is "unauthorized"; in which latter case the subscriber is not even aware of

05 the occurrence of a call.

The present invention has as its object the processing of incoming calls to provide alert signals, or rings, which are characteristic of the source of the call. Thus, calls are not filtered by the present

10 invention, but processed to provide a characterizing audible signal cross-referenced to a call's source, even before the phone is answered.

The invention in its general form will first be described, and then its implementation in terms of

15 specific embodiments will be detailed with reference to the drawings following hereafter. These embodiments are intended to demonstrate the principle of the invention, and the manner of its implementation. The invention in its broadest and more specific forms will then be further

20 described, and defined, in each of the individual claims which conclude this Specification.

#### Summary of the Invention

According to one of its broadest aspects, the invention comprises a telecommunications device that

produces an audible indication of the identity, or category, of the source of an incoming phone call. By appropriate programming the device can be used to identify the intended recipient of a call by producing a 05 different, personalized ring for each of a number of call sources that have been identified as being likely to be calls directed to such intended recipient. It can also produce a ring identifying the category of the incoming call (business, family, etc.).

10 The invention is intended as an affordable device that can be connected between the wall jack and a phone unit. The user must be subscribed to the Caller Identification service offered by the local telephone 15 company which provides a signal corresponding to the caller's source phone number; or have the cooperation of the Caller in providing a special source identifier signal, in order for the invention to operate.

20 The invention is a user-programmable device. It can be programmed using the touch-tone buttons of the phone unit or using a dedicated input system such as a keypad. Optionally the programming can be done while the phone is ringing (on-hook), while the conversation 25 is taking place (off-hook), or in between calls.

When an incoming phone call is detected, the 25 unit may display the Caller ID of the caller on a standard liquid crystal display unit. To program the device to produce an identifying sound corresponding to

this number, the call recipient can use the phone unit's touch tone buttons to tag and store the calling source's originating telephone number as an identifier and provide a co-related distinct audible signal that is 05 assigned to such source identifier. The co-related audible signal may be drawn from a class of pre-recorded audible signal patterns available from within the device, or may be user generated.

10 As examples of the type of audible signals to be emitted a specific sound may be reserved for a specific calling source, or such signals may designate the likely intended recipient of an incoming call. Further, multiple signals may be provided.

15 Thus, for example, on receiving an incoming call two buttons may be pressed in succession, the first indicating that the source of the call is of a category assigned to a specific intended call recipient (such as child or adult in a household); the second further distinguishing the category of the call within a 20 subclass (such as business or personal). The next time an incoming call from this number will be detected, the device of the invention may produce an audible sound or ring consisting of two parts, one identifying the assigned intended recipient and the other identifying 25 the category of the call. The device is thus easily and incrementally programmed by the user.

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Accordingly, the present invention provides an apparatus for distinguishing between at least two pluralities of 20 incoming telephone (or the like) calls, comprising:

05 (a) means for storing a first plurality of incoming caller identification data;

(b) means for identifying a second plurality of incoming caller identification data;

10 (c) alerting means responsive in a first mode of alerting to an incoming call belonging to the first plurality, and responsive in a second mode to an incoming call belonging to the second plurality.

The invention is based upon a telephone call answering device comprising:

15 (1) means to intercept an incoming telephone signal from a source that provides in such signal a source identifier associated with the identity of the calling source;

20 (2) storage means for preserving a record of a plurality of stored calling source identifiers;

(3) comparator means for comparing the incoming source identity indication with the stored calling source identity indications to determine if a match exists;

25 (4) audible alerting means for generating a distinct audible signal corresponding to said incoming

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source identifier when said comparator means determines that a match exists between the incoming source identifier and one of said stored calling source identity indications.

05 The invention may further comprise user-activated input means to:

(a) store a specific incoming source identifier as a stored calling source identity indication in said storage means; and

10 (b) establish the distinct audible signal that corresponds to such specific incoming source identifier.

Additionally, the apparatus of the invention may operate in combination with a telephone receiver having

15 a tone generating keypad wherein the user activated input means comprises such keypad.

The device of the invention may be used in combination with a telephone receiver having a tone generating keypad wherein:

20 (a) said audible alerting means contains a ring storage register for storing ring codes for generating each respective distinct audible signal; and

(b) said keypad is coupled to said audible alerting means for providing such storage register with stored ring codes.

Further, such device, in combination with a telephone receiver, may be provided with means to suppress the normal ring signal of such telephone receiver when a match is established by a comparator, or 05 to permit said telephone receiver to emit its normal ring signal when a match is not established by the comparator.

The foregoing summarizes the principal features of the invention and some of its optional aspects. The 10 invention may be further understood by the description of the preferred embodiments in conjunction with the general knowledge of those skilled in this field, and the drawings, which now follow.

Brief Description of the Drawings

15 Figure 1 is an overall block schematic of the apparatus according to the present invention;

Figure 2 is an Algorithmic State Machine diagram of the operation of the apparatus, according to the present invention;

20 Figure 3 is a functional tree diagram showing the functions of the apparatus of Figure 1.

Figure 4 is a data flow diagram in the apparatus of Figure 1; and

25 Figure 5 is a flow chart for the program identifying the state machine of Figure 2.

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Detailed Description of the Preferred Embodiment

Referring to the drawings, Figure 1 shows the block diagram of the device, indicating the various functional units of the device. As can be seen, a phone unit 10 is separate, but may be made an integral part of the apparatus. A demodulator block 11 is used to extract the digital information containing the Caller ID that is transmitted between the first and second rings of an incoming call. A tone decoder 12 is needed to recognize the touch tone button inputs of the user received from the phone unit. Non-volatile memory 13 is used to store the device software and the user programmed numbers. The memory 13 may be a non-volatile RAM or other equivalent system.

Figure 2 shows an Algorithmic State Machine (ASM) diagram of the unit. It shows the flow of control for the design. Each possible state is represented by a circle, with its title next to it in the oval-shaped bubble. Inside the circles are the outputs for that state. Arrows represent conditions that cause a state transition. The condition is written next to the arrow.

Figure 3 is a functional breakdown of the design in tree form, showing all the functions and their relations, or groupings. There are four main categories of functions for the design, which are then subdivided into smaller, more specific functions.

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Figure 4 illustrates the flow of data in the design. There are two inputs: tones from the phone unit, and modulated digital data from the telephone source. The diagram shows how this information is captured by the unit and transformed into useful signals corresponding to the source of the input, and its destination within the system.

05

Figure 5 shows a software structured flow chart, identifying the various decisions and general functions the software must make. The design has two branches, which will work in parallel: the call capture, process and ring output module. The programming section, which can be activated at several stages during the execution of the normally running the other software modules.

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### 15 Conclusion

The foregoing has constituted a description of specific embodiments showing how the invention may be applied and put into use. These embodiments are only exemplary. The invention in its broadest, and more specific aspects, is further described and defined in 20 the claims which now follow.

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These claims, and the language used therein, are to be understood in terms of the variants of the invention which have been described. They are not to be restricted to such variants, but are to be read as covering the full scope of the invention as is implicit within the invention and the disclosure that has been provided herein.

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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY IS CLAIMED AS FOLLOWS:

1. Apparatus for distinguishing between two pluralities of incoming telephone (or the like) calls, comprising:
  - (a) means for storing a first plurality of incoming caller identification data;
  - (b) means for identifying a second plurality of incoming caller identification data;
  - (c) alerting means responsive in a first mode of alerting to an incoming call belonging to the first plurality, and responsive in a second mode to an incoming call belonging to the second plurality.
2. A telephone call answering device comprising:
  - (1) means to intercept an incoming telephone signal from a source that provides in such signal a source identifier associated with the identity of the calling source;
  - (2) storage means for preserving a record of a plurality of stored calling source identifiers;
  - (3) comparator means for comparing the incoming source identity indication with the stored calling source identity indications to determine if a match exists;

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(4) audible alerting means for generating a distinct audible signal corresponding to said incoming source identifier when said comparator means determines that a match exists between the incoming source identifier and one of said stored calling source identity indications.

3. A device as in claim 2 further comprising user-activated input means to:

- (a) store a specific incoming source identifier as a stored calling source identity indication in said storage means; and
- (b) establish the distinct audible signal that corresponds to such specific incoming source identifier.

A device as in claim 3 in combination with a telephone receiver having a tone generating keypad wherein said user activated input means comprises said keypad.

4. A device as in claim 2, 3 or 4 in combination with a telephone receiver having a tone generating keypad wherein:

- (a) said audible alerting means contains a ring storage register for storing ring codes for generating each respective distinct audible signal; and

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(b) said keypad is coupled to said audible alerting means for providing such storage register with stored ring codes.

5. A device as in claim 2, 3 or 4 in combination with a telephone receiver further comprising means to suppress the normal ring signal of such telephone receiver when a match is established by a comparator.

6. A device as in claims 2 or 3 in combination with a telephone receiver further comprising means to permit said telephone receiver to emit its normal ring signal when a match is not established by the comparator.

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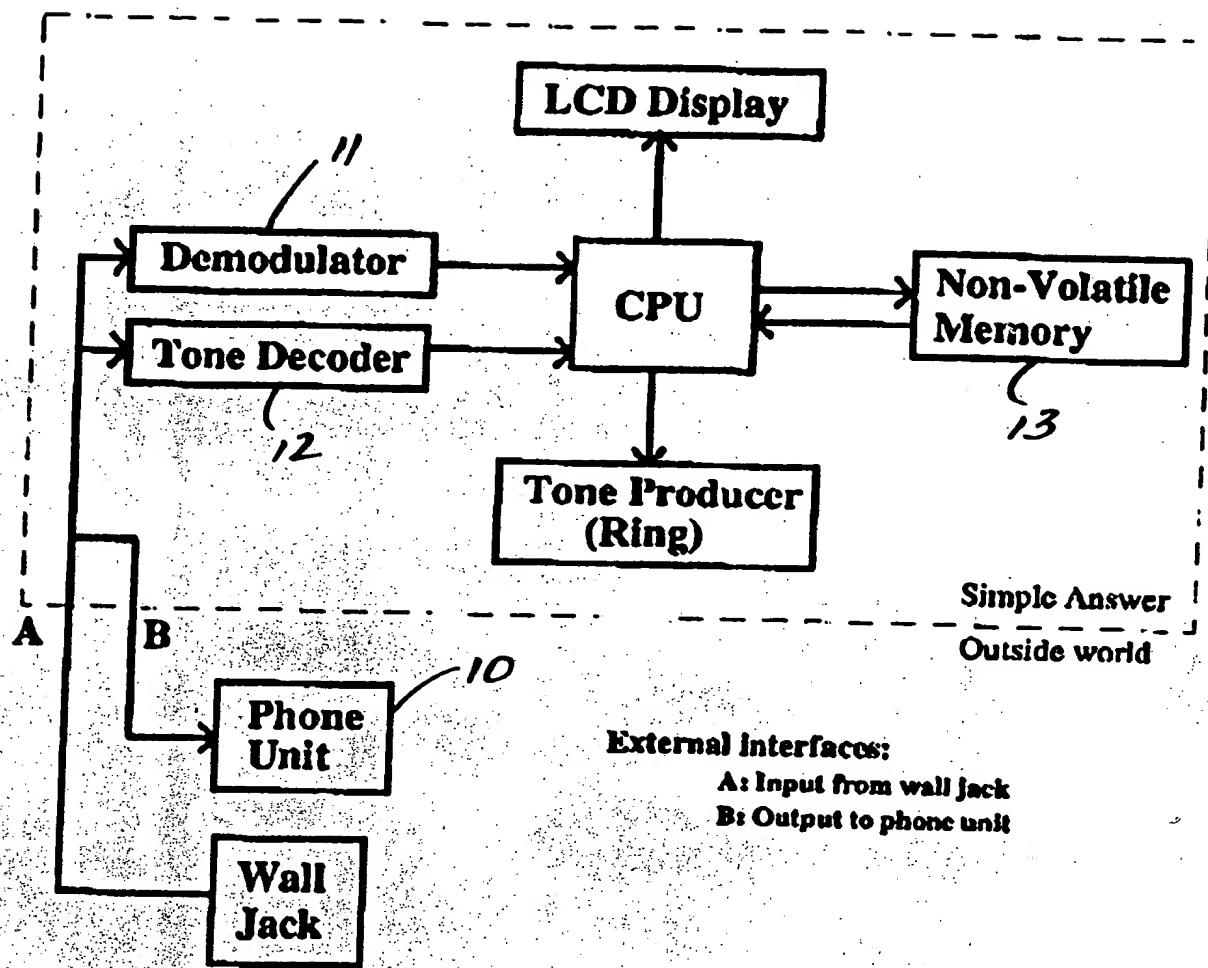


Fig. 1 Block Diagram

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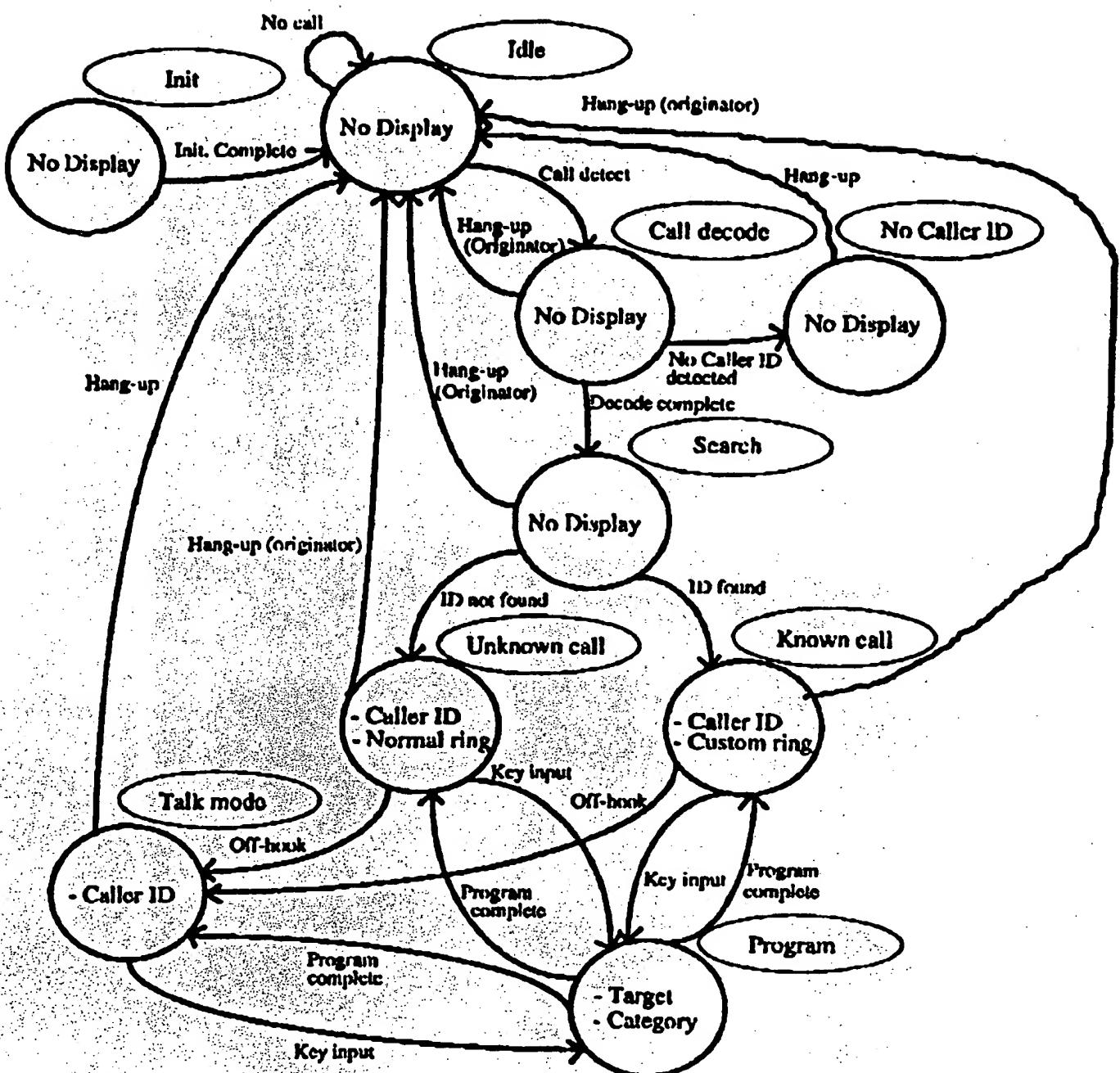


Fig. 2 ASM Diagram

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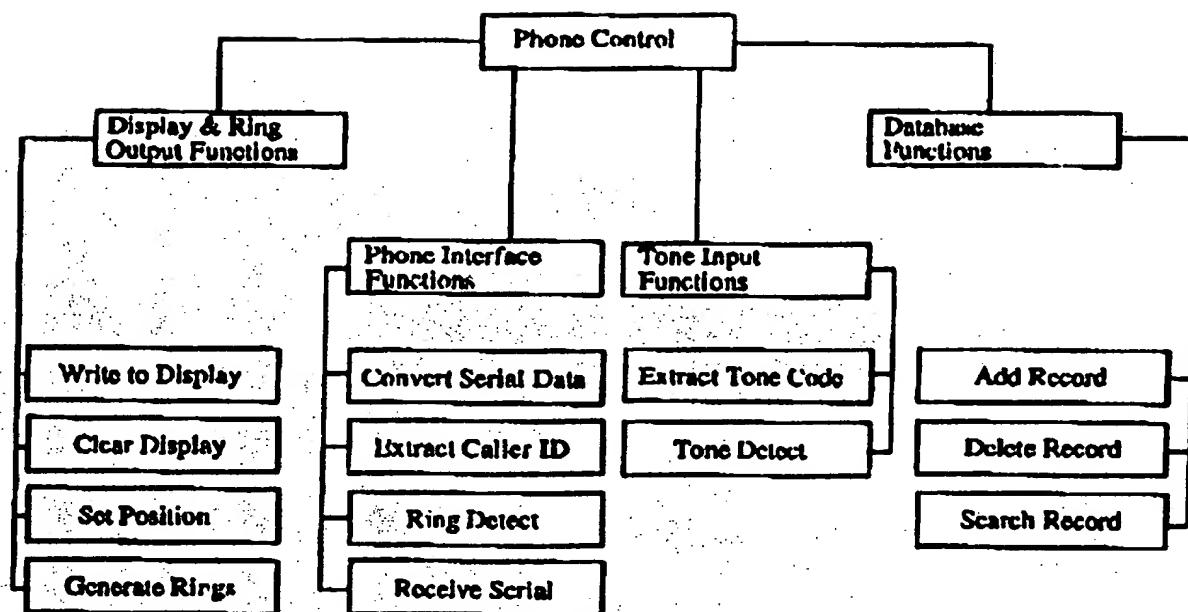


Fig. 3 Functional decomposition

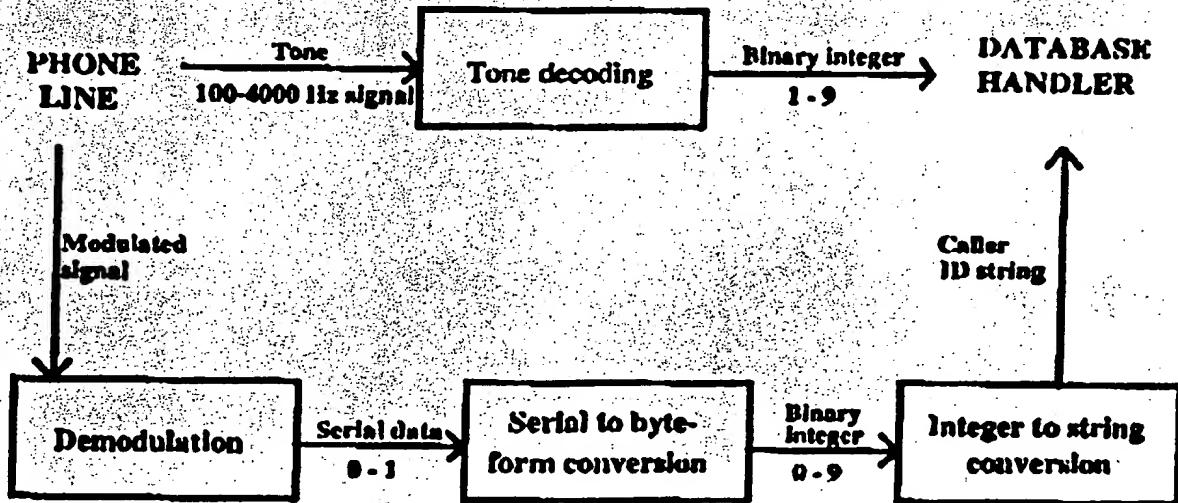


Fig. 4 Data flow diagram

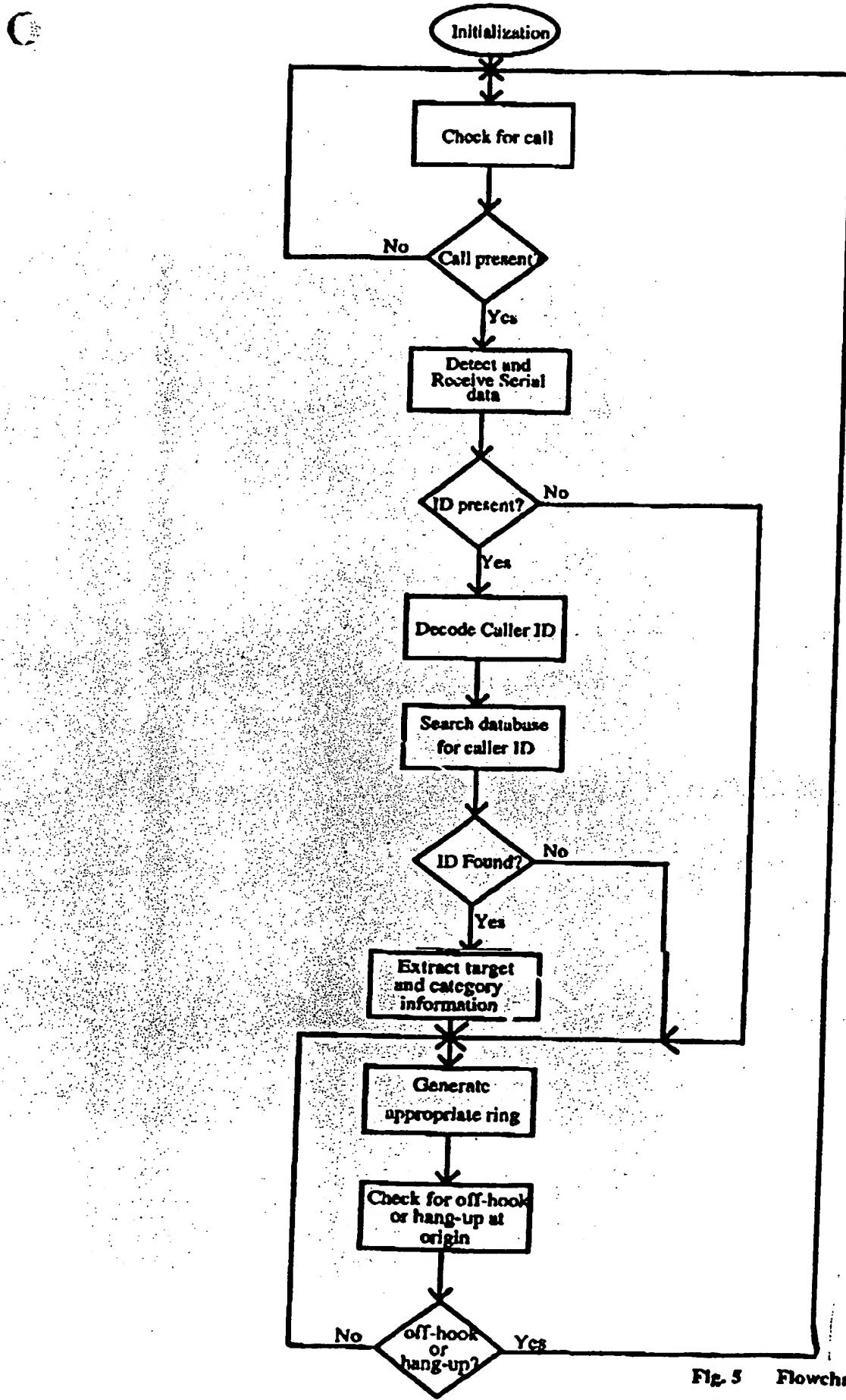


Fig. 5 Flowchart

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